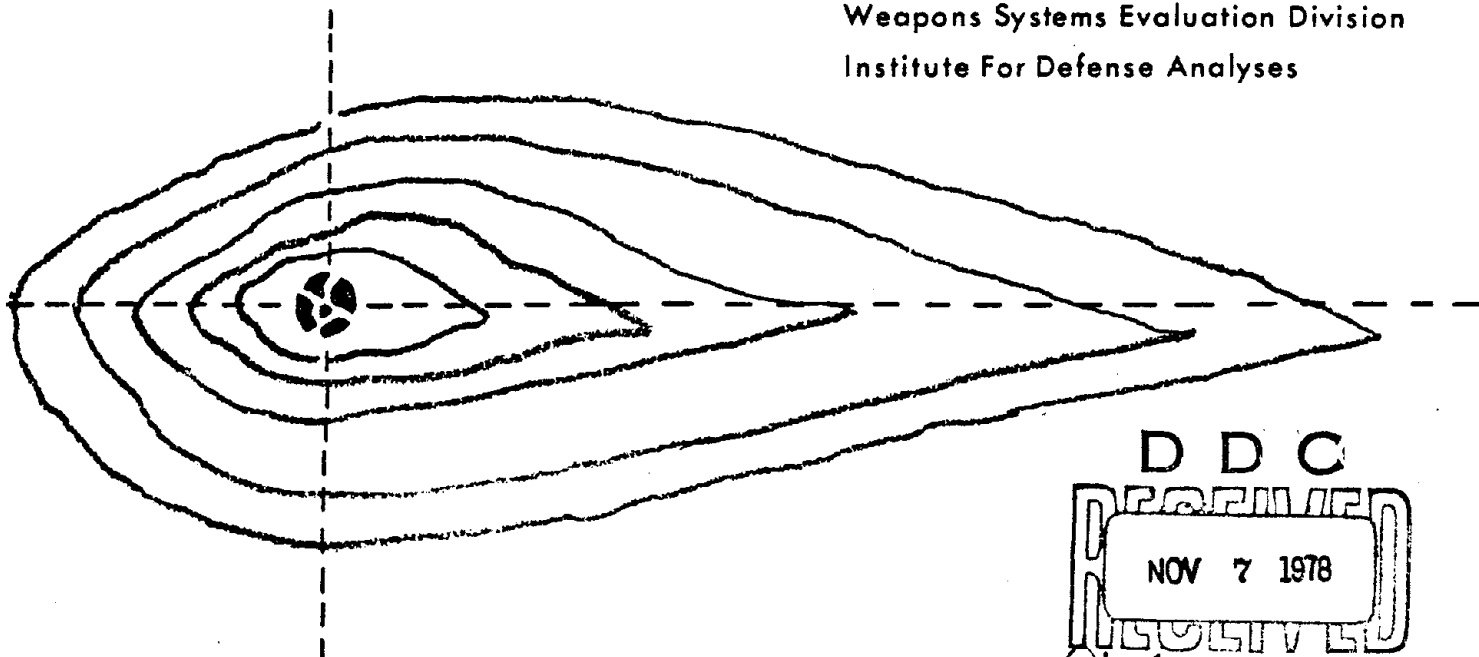


AN ANALYTIC MODEL OF CLOSE-IN DEPOSITION OF FALLOUT FOR USE IN OPERATIONAL-TYPE STUDIES

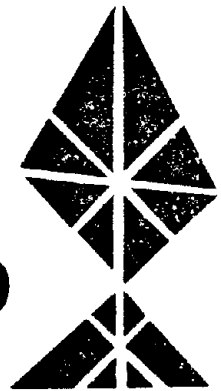
George E. Pugh
Robert J. Galiano
Weapons Systems Evaluation Division
Institute For Defense Analyses



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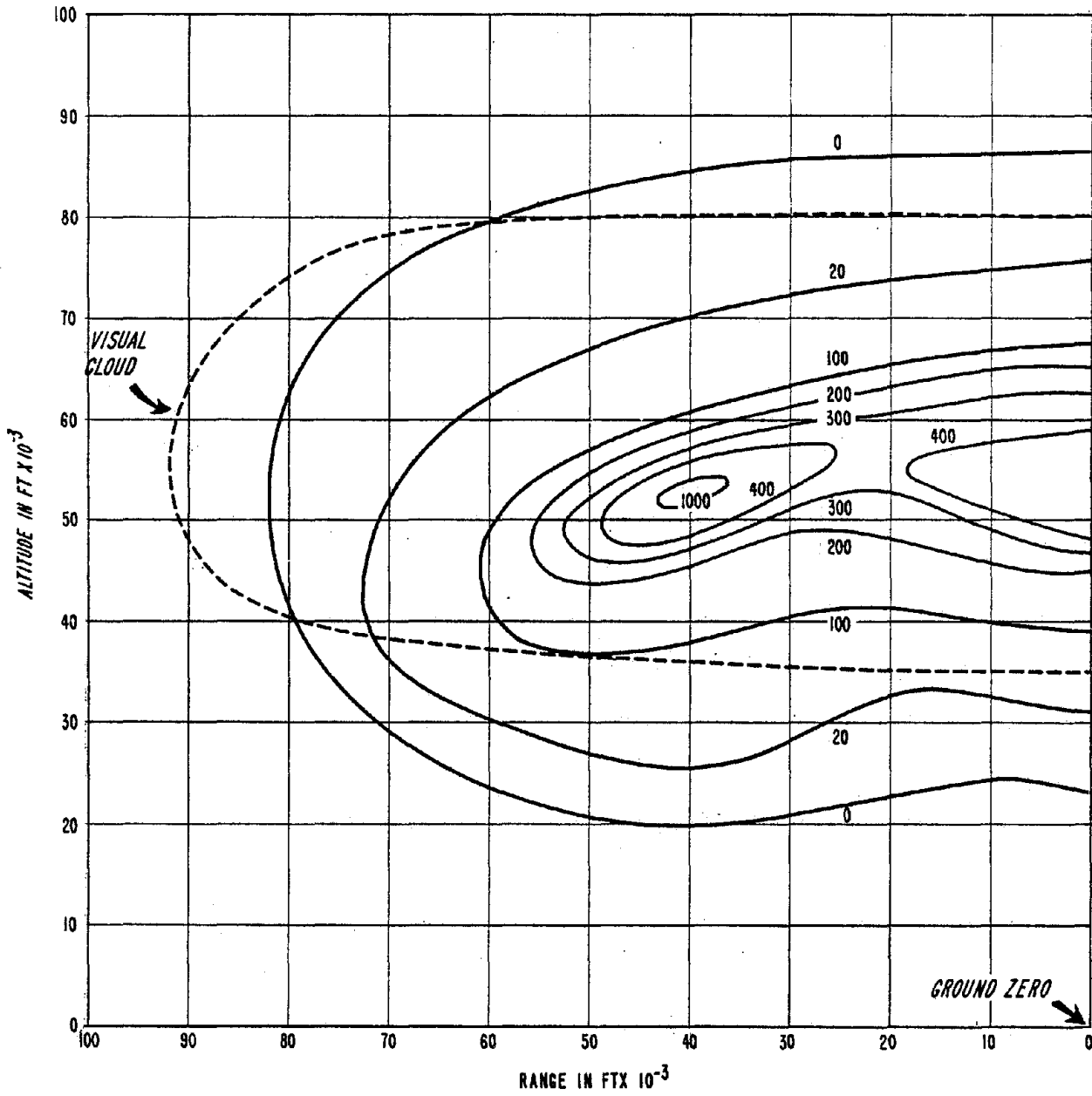


WEAPONS SYSTEMS EVALUATION GROUP
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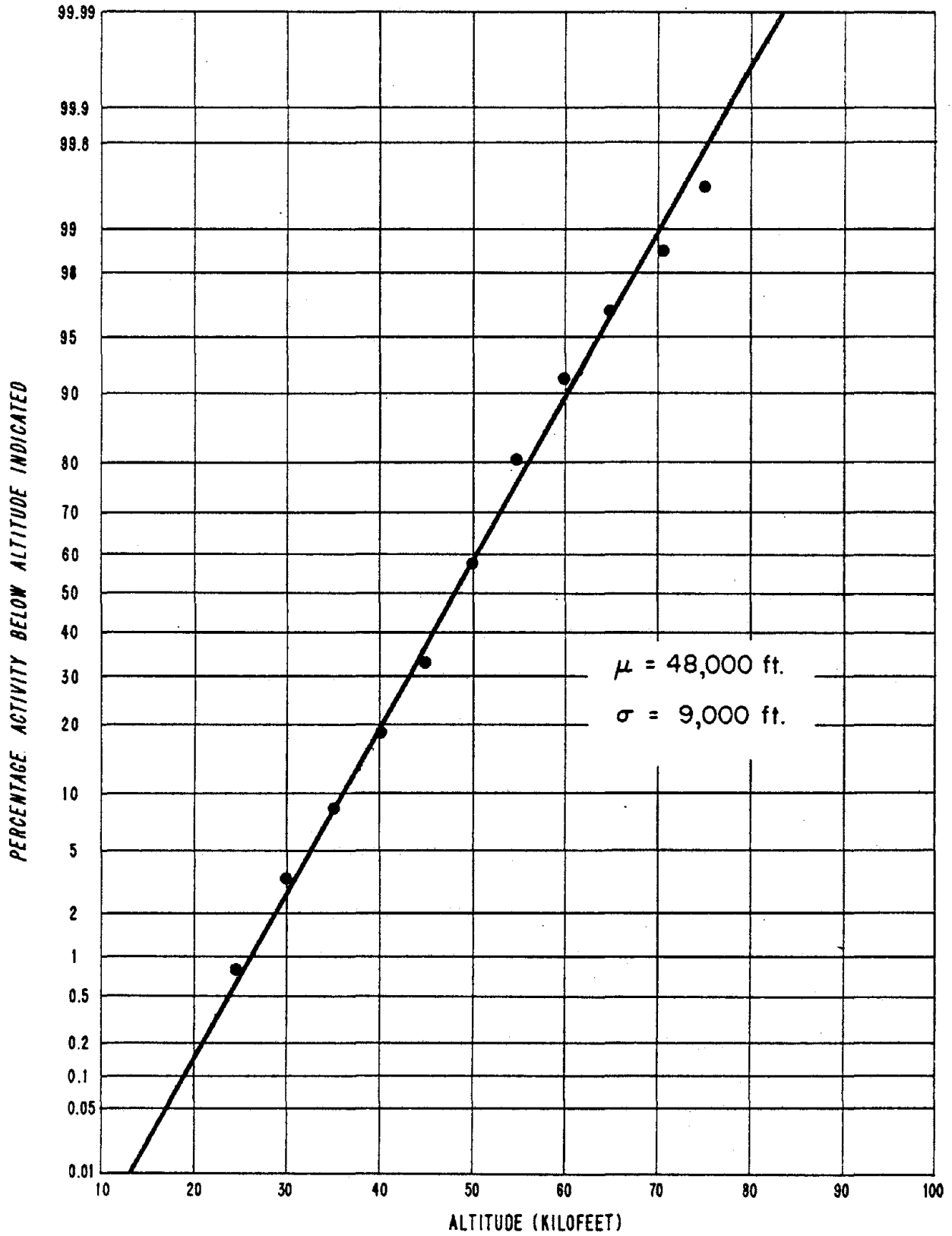
TYPICAL CLOUD RADIOACTIVITY INTENSITY CONTOURS

15 MINUTES AFTER BURST

INTENSITY IN ARBITRARY UNITS

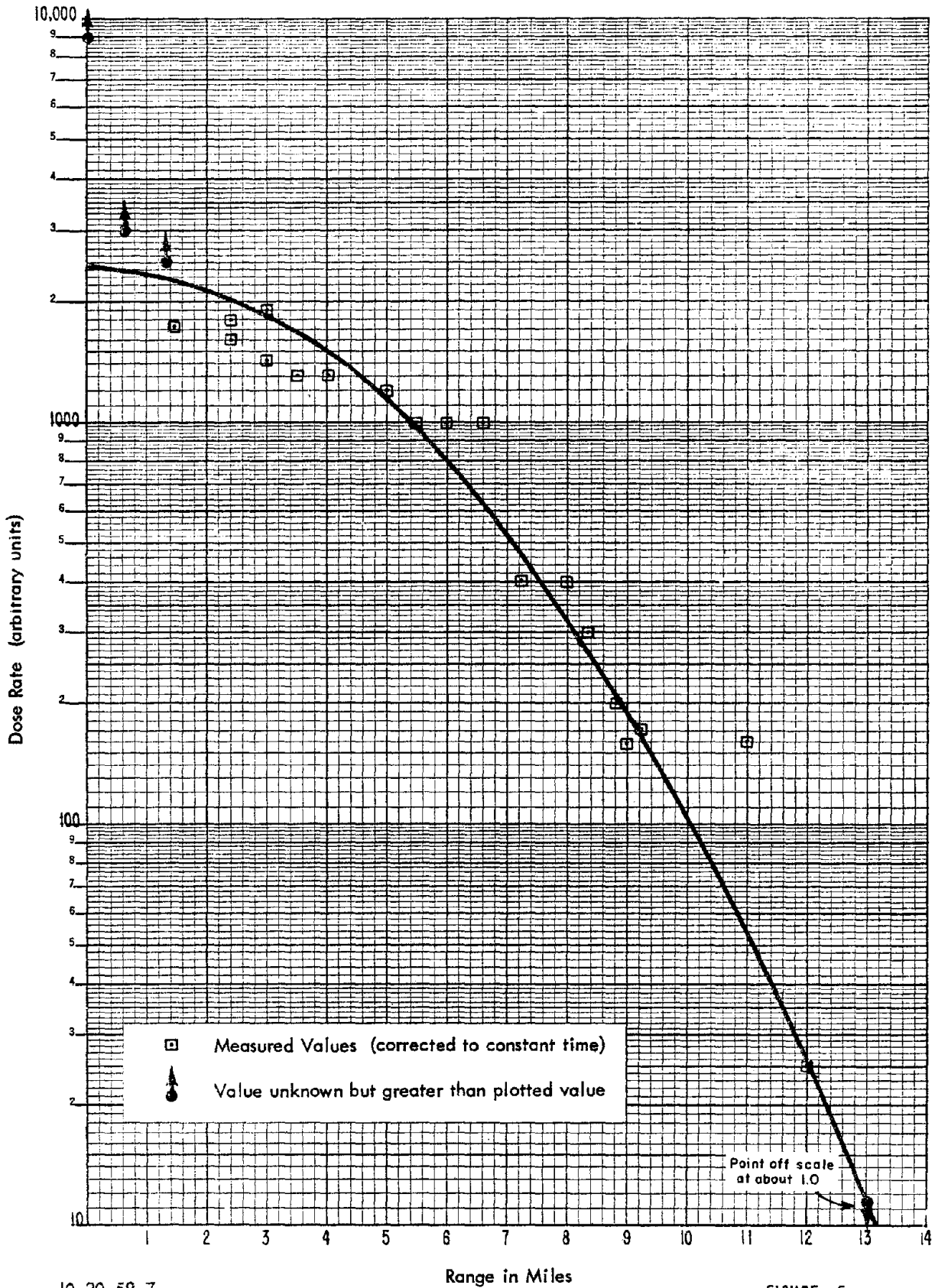


FIT OF NORMAL DISTRIBUTION TO DISTRIBUTION IN ALTITUDE



10-20-58-6

CROSSWIND AND UPWIND DOSE RATE



10-20-58-7

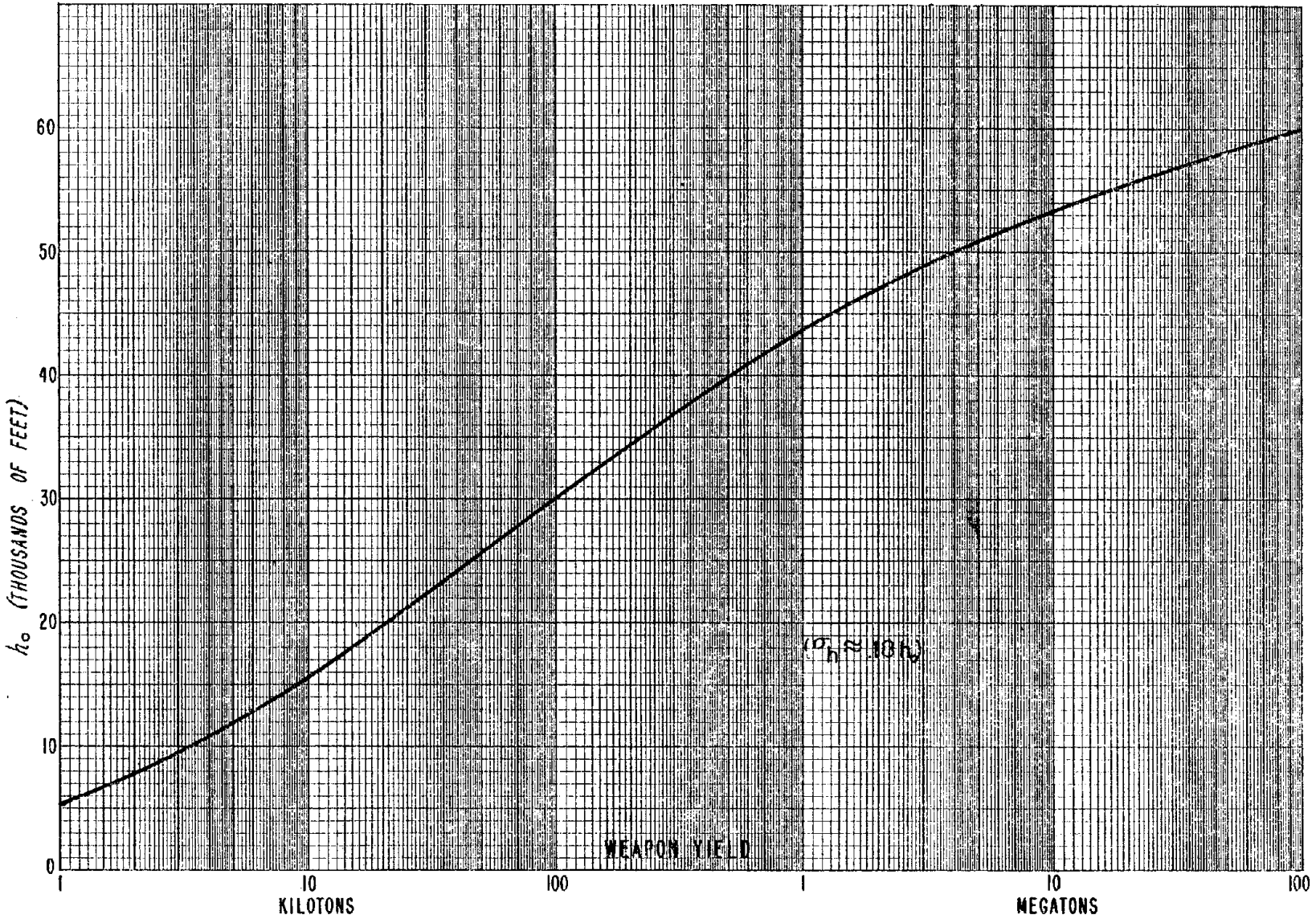
Range in Miles

FIGURE 5

WSEG RESEARCH MEMORANDUM NO. 10

FIGURE 7

ESTIMATED CLOUD HEIGHT h_0 (RADIOACTIVE CENTER) VS. WEAPON YIELD



Calculated Fallout Contours

("H+1" Dose Rate Contours)

.01 YIELD (MEGATONS) 0 WIND (KNOTS)

ALL DISTANCES AND AREAS ARE SHOWN IN STATUTE MILES TO 2 DECIMAL PLACES. DECIMAL (NOT SHOWN); SHOULD BE READ BEFORE LAST 2 DIGITS.

EFFECTIVE FALLOUT SHEAR 0.1 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	849-	766	512	512	13382	12976	
3	782-	702	471	471	11283	10981	
10	701-	632	422	422	8995	8843	
30	618-	568	372	372	6880	6937	
100	511-	495	308	308	4507	4874	
300	390-	288	235	235	2338	2501	
1000	179-	60	108	108	389	404	
3000							
10000							
30000							
MAXIMUM DOSE							
1377							
EFFECTIVE FALLOUT SHEAR 0.2 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	816-	740	859	859	21109	20987	
3	745-	676	785	785	17573	17525	
10	660-	606	695	695	13694	13816	
30	571-	542	601	601	10037	10508	
100	454-	404	478	478	5971	6436	
300	310-	189	327	327	2414	2563	
1000							
3000							
10000							
30000							
MAXIMUM DOSE							
788							
EFFECTIVE FALLOUT SHEAR 0.4 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	775-	705	1567	1567	36261	36417	
3	700-	640	1417	1417	29561	29839	
10	609-	570	1231	1231	22125	22793	
30	511-	506	1033	1033	14469	16494	
100	375-	280	759	759	7300	7812	
300	177-	62	357	357	1287	1340	
1000							
3000							
10000							
30000							
MAXIMUM DOSE							
410							

Calculated Fallout Contours

("H+1" Dose Rate Contours)

.01 YIELD (MEGATONS) 20 WIND (KNOTS)

ALL DISTANCES AND AREAS ARE SHOWN IN STATUTE MILES TO 2 DECIMAL PLACES. DECIMAL (NOT SHOWN) SHOULD BE READ BEFORE LAST 2 DIGITS.

EFFECTIVE FALLOUT SHEAR 0.1 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	64-	18541	76	427	115082	124809	11700
3	57-	15469	68	325	74093	79285	9600
10	47-	11939	59	224	39669	42152	7700
30	37-	8560	49	140	18886	18959	4500
100	23-	4819	35	71	5611	5393	2100
300	4-	1780	13	31	829	865	500
1000							
3000							
10000							
30000							
MAXIMUM DOSE							
540							

EFFECTIVE FALLOUT SHEAR 0.2 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	64-	16760	76	686	160375	181230	11700
3	57-	13633	68	498	96658	107040	9600
10	47-	10061	59	317	46183	50352	6000
30	37-	6749	49	184	18485	19623	4500
100	23-	3385	35	81	4211	4329	2100
300	4-	1158	13	31	492	567	500
1000							
3000							
10000							
30000							
MAXIMUM DOSE							
482							

EFFECTIVE FALLOUT SHEAR 0.4 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	64-	14839	76	1116	229966	261340	9600
3	57-	11651	69	772	125179	142021	7700
10	47-	8047	59	441	51113	56099	4500
30	37-	4870	49	231	16254	17842	3200
100	23-	2074	35	88	2654	2907	1200
300	4-	678	13	26	252	275	500
1000							
3000							
10000							
30000							
MAXIMUM DOSE							
358							

Calculated Fallout Contours

("H+1" Dose Rate Contours)

.1

 YIELD (MEGATONS)

0

 WIND (KNOTS)

ALL DISTANCES AND AREAS ARE SHOWN IN STATUTE MILES TO 2 DECIMAL PLACES. DECIMAL (NOT SHOWN) SHOULD BE READ BEFORE LAST 2 DIGITS.

EFFECTIVE FALLOUT SHEAR 0.1 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	2557-	2460	1611	1671	133502	131670	500
3	2356-	2277	1484	1533	112431	111568	500
10	2115-	2061	1332	1366	90001	89623	500
30	1867-	1770	1176	1194	69295	68213	500
100	1552-	1450	977	977	47205	46089	
300	1193-	1123	751	751	27229	27323	
1000	585-	521	369	369	5926	6409	
3000							
10000							
30000							
MAXIMUM DOSE							
1465							
EFFECTIVE FALLOUT SHEAR 0.2 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	2462-	2396	2630	2630	203760	200663	
3	2254-	2211	2406	2406	169400	168761	
10	2000-	1954	2135	2135	133375	132606	
30	1736-	1658	1854	1854	99708	98837	
100	1391-	1334	1485	1485	63379	63572	
300	974-	891	1040	1040	30295	30477	
1000							
3000							
10000							
30000							
MAXIMUM DOSE							
864							
EFFECTIVE FALLOUT SHEAR 0.4 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	2343-	2299	4752	4752	345703	346460	
3	2122-	2113	4304	4304	278064	286366	
10	1850-	1795	3753	3753	214536	214914	
30	1562-	1498	3157	3167	152103	152204	
100	1166-	1145	2364	2364	84219	85813	
300	611-	569	1240	1240	22254	22986	
1000							
3000							
10000							
30000							
MAXIMUM DOSE							
455							

Calculated Fallout Contours

("H+1" Dose Rate Contours)

.1 YIELD (MEGATONS)

20 WIND (KNOTS)

ALL DISTANCES AND AREAS ARE SHOWN IN STATUTE MILES TO 2 DECIMAL PLACES. DECIMAL (NOT SHOWN) SHOULD BE READ BEFORE LAST 2 DIGITS.

EFFECTIVE FALLOUT SHEAR 0.1 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	232-	35236	276	1526	789364	850402	22100
3	207-	29899	251	1198	530648	566371	19200
10	177-	23796	221	857	309812	322741	14000
30	145-	17983	189	586	163733	166943	11700
100	102-	11426	146	334	61750	60435	6000
300	50-	5629	91	163	15486	14538	2100
1000	479	575		19	25	311	500
3000							
10000							
30000							
MAXIMUM DOSE							
1022							
EFFECTIVE FALLOUT SHEAR 0.2 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	232-	32162	278	2475	1117704	1259283	22100
3	207-	26745	253	1857	713874	786261	16500
10	177-	20588	222	1264	378453	412198	14000
30	145-	14819	190	797	175363	187409	9600
100	102-	8633	147	395	53912	54190	4500
300	49-	3856	91	173	10977	10688	2100
1000							
3000							
10000							
30000							
MAXIMUM DOSE							
967							
EFFECTIVE FALLOUT SHEAR 0.4 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	232-	28850	284	4101	1642228	1873360	19200
3	207-	23330	258	2944	972651	1088504	16500
10	176-	17101	227	1870	455554	507402	11700
30	144-	11413	194	1069	178083	194133	7700
100	101-	5802	149	466	41188	43171	3200
300	48-	2253	91	180	6334	6517	1200
1000							
3000							
10000							
30000							
MAXIMUM DOSE							
811							

Calculated Fallout Contours

("H+1" Dose Rate Contours)

.3 YIELD (MEGATONS)

0 WIND (KNOTS)

ALL DISTANCES AND AREAS ARE SHOWN IN STATUTE MILES TO 2 DECIMAL PLACES. DECIMAL (NOT SHOWN) SHOULD BE READ BEFORE LAST 2 DIGITS.

EFFECTIVE FALLOUT SHEAR 0.1 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	3761-	3642	2455	2570	302882	298913	1200
3	3480-	3381	2271	2352	256854	253434	1200
10	3143-	3048	2051	2114	208349	205572	800
30	2800-	2672	1827	1875	163687	161120	500
100	2367-	2260	1545	1571	115251	114179	500
300	1888-	1760	1232	1232	72053	70632	
1000	1154-	1035	753	753	25694	25906	
3000							
10000							
30000							
MAXIMUM DOSE							
2050							
EFFECTIVE FALLOUT SHEAR 0.2 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	3635-	3558	3928	3956	452892	446947	500
3	3343-	3295	3612	3631	379747	378560	500
10	2990-	2921	3231	3237	304351	300551	500
30	2627-	2541	2839	2839	233644	230452	
100	2161-	2124	2335	2335	154416	157131	
300	1622-	1531	1753	1753	87198	86808	
1000	630-	565	681	681	12320	12779	
3000							
10000							
30000							
MAXIMUM DOSE							
1238							
EFFECTIVE FALLOUT SHEAR 0.4 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	3470-	3425	7055	7055	764285	764148	
3	3162-	3144	6430	6430	636354	636997	
10	2787-	2724	5667	5667	491771	490574	
30	2394-	2341	4867	4867	361395	361952	
100	1870-	1813	3802	3802	219254	219914	
300	1207-	1197	2455	2455	90773	92734	
1000							
3000							
10000							
30000							
MAXIMUM DOSE							
658							

Calculated Fallout Contours

("H+1" Dose Rate Contours)

.3 YIELD (MEGATONS) 20 WIND (KNOTS)

ALL DISTANCES AND AREAS ARE SHOWN IN STATUTE MILES TO 2 DECIMAL PLACES. DECIMAL (NOT SHOWN) SHOULD BE READ BEFORE LAST 2 DIGITS.

EFFECTIVE FALLOUT SHEAR 0.1 KNOTS/1000 FT. ALTITUDE							
1	2	3	4	5	6	7	8
DOSE (ROENTGENS)	MAXIMUM UPWIND POSITION	MAXIMUM DOWNWIND DISTANCE	CROSSWIND HALFWIDTH AT ORIGIN	MAXIMUM CROSSWIND HALFWIDTH	ACTUAL AREA	ESTIMATED AREA (ELLIPSE)	RANGE TO MAXIMUM WIDTH
1	382-	45712	457	2512	1692926	1718628	28500
3	344-	39271	419	2010	1173916	1250660	25200
10	298-	31921	373	1488	719881	753032	19200
30	250-	24937	325	1058	409377	418596	16500
100	188-	17024	262	684	177512	176701	9600
300	116-	9791	187	355	57686	55288	4500
1000	50	2768		140	5881	6216	500
3000							
10000							
30000							
MAXIMUM DOSE							
1659							
EFFECTIVE FALLOUT SHEAR 0.2 KNOTS/1000 FT. ALTITUDE							
1	2	3	4	5	6	7	8
DOSE (ROENTGENS)	MAXIMUM UPWIND POSITION	MAXIMUM DOWNWIND DISTANCE	CROSSWIND HALFWIDTH AT ORIGIN	MAXIMUM CROSSWIND HALFWIDTH	ACTUAL AREA	ESTIMATED AREA (ELLIPSE)	RANGE TO MAXIMUM WIDTH
1	381-	42011	461	4099	2447183	2729838	28500
3	344-	35490	422	3153	1608493	1774661	22100
10	298-	28077	375	2227	910202	992715	19200
30	250-	21118	327	1486	465553	498708	14000
100	188-	13483	264	818	170647	175706	7700
300	116-	7086	188	390	45668	44134	4500
1000	62	1908		140	3934	4337	500
3000							
10000							
30000							
MAXIMUM DOSE							
1587							
EFFECTIVE FALLOUT SHEAR 0.4 KNOTS/1000 FT. ALTITUDE							
1	2	3	4	5	6	7	8
DOSE (ROENTGENS)	MAXIMUM UPWIND POSITION	MAXIMUM DOWNWIND DISTANCE	CROSSWIND HALFWIDTH AT ORIGIN	MAXIMUM CROSSWIND HALFWIDTH	ACTUAL AREA	ESTIMATED AREA (ELLIPSE)	RANGE TO MAXIMUM WIDTH
1	380-	38021	475	6870	3658327	4144054	25200
3	342-	31381	435	5089	2263347	2536089	22100
10	296-	23876	387	3396	1160674	1289285	16500
30	248-	16943	336	2086	513274	563255	11700
100	186-	9706	270	1025	146847	159195	6000
300	113-	4424	191	425	30303	30298	2100
1000	118	1066		134	1814	2496	500
3000							
10000							
30000							
MAXIMUM DOSE							
1370							

Calculated Fallout Contours

("H+1" Dose Rate Contours)

1 YIELD (MEGATONS)

0 WIND (KNOTS)

ALL DISTANCES AND AREAS ARE SHOWN IN STATUTE MILES TO 2 DECIMAL PLACES. DECIMAL (NOT SHOWN) SHOULD BE READ BEFORE LAST 2 DIGITS.

EFFECTIVE FALLOUT SHEAR 0.1 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	5267-	5053	3677	3892	639116	630972	1000
3	4900-	4705	3420	3607	548764	544225	1000
10	4462-	4324	3115	3266	446741	450794	1000
30	4022-	3847	2808	2920	362143	360954	1000
100	3476-	3243	2426	2487	266576	262473	1000
300	2888-	2693	2016	2016	180901	176773	
1000	2061-	1819	1439	1439	88227	87692	
3000	714-	401	499	499	8256	8738	
10000							
30000							
MAXIMUM DOSE							
3485							
EFFECTIVE FALLOUT SHEAR 0.2 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	5116-	4958	5663	5730	921599	906842	1000
3	4737-	4609	5243	5286	786050	775978	1000
10	4283-	4225	4741	4751	626667	635009	1000
30	3822-	3682	4230	4230	505970	498668	
100	3242-	3071	3589	3589	360931	355865	
300	2603-	2512	2881	2881	228041	231498	
1000	1637-	1447	1812	1812	87532	87756	
3000							
10000							
30000							
MAXIMUM DOSE							
2198							
EFFECTIVE FALLOUT SHEAR 0.4 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	4908-	4794	10031	10031	1536257	1528723	
3	4512-	4442	9220	9220	1291051	1296790	
10	4032-	3971	8241	8241	1033367	1035927	
30	3539-	3407	7232	7232	790421	789028	
100	2903-	2790	5932	5932	529080	530464	
300	2165-	2064	4425	4425	290120	294038	
1000	770-	574	1574	1574	31069	33245	
3000							
10000							
30000							
MAXIMUM DOSE							
1190							

Calculated Fallout Contours

("H+1" Dose Rate Contours)

1 YIELD (MEGATONS)

20 WIND (KNOTS)

ALL DISTANCES AND AREAS ARE SHOWN IN STATUTE MILES TO 2 DECIMAL PLACES. DECIMAL (NOT SHOWN) SHOULD BE READ BEFORE LAST 2 DIGITS.

EFFECTIVE FALLOUT SHEAR 0.1 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	631-	58914	766	4068	3537870	3804572	38400
3	574-	51282	707	3322	2530839	2705930	33000
10	506-	42616	637	2549	1648371	1726642	28000
30	436-	34426	565	1890	1009099	1035044	19200
100	347-	25141	473	1270	505405	508483	15400
300	248-	16485	370	778	209234	204489	9000
1000	99-	7303	205	365	44113	42415	2400
3000							
10000							
30000							
MAXIMUM DOSE							
2749							
EFFECTIVE FALLOUT SHEAR 0.2 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	631-	54592	774	6596	5148171	5721218	38400
3	574-	46885	715	5225	3530726	3895119	33000
10	505-	38188	643	3854	2139056	2342227	23400
30	435-	30007	570	2737	1208946	1308736	19200
100	346-	20919	477	1663	530655	555480	12000
300	247-	12837	373	903	185740	185655	6400
1000	98-	5240	205	380	32514	31849	2400
3000							
10000							
30000							
MAXIMUM DOSE							
2565							
EFFECTIVE FALLOUT SHEAR 0.4 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	629-	49910	806	11238	7836837	8921354	33000
3	572-	42080	743	8654	5122062	5797699	28000
10	503-	33276	669	6047	2833814	3208456	23400
30	432-	25080	592	4034	1459028	1616554	15400
100	343-	16207	494	2209	533316	574264	9000
300	243-	8878	384	1051	147160	150515	4200
1000	91-	3161	205	385	19580	19663	1000
3000							
10000							
30000							
MAXIMUM DOSE							
2082							

Calculated Fallout Contours

("H+1" Dose Rate Contours)

3

YIELD (MEGATONS)

0

WIND (KNOTS)

ALL DISTANCES AND AREAS ARE SHOWN IN STATUTE MILES TO 2 DECIMAL PLACES. DECIMAL (NOT SHOWN) SHOULD BE READ BEFORE LAST 2 DIGITS.

EFFECTIVE FALLOUT SHEAR 0.1 KNOTS/1000 FT. ALTITUDE							
1	2	3	4	5	6	7	8
DOSE (ROENTGENS)	MAXIMUM UPWIND POSITION	MAXIMUM DOWNWIND DISTANCE	CROSSWIND HALFWIDTH AT ORIGIN	MAXIMUM CROSSWIND HALFWIDTH	ACTUAL AREA	ESTIMATED AREA (ELLIPSE)	RANGE TO MAXIMUM WIDTH
1	6777-	6597	5190	5674	1172611	1191951	2400
3	6336-	6149	4853	5240	1023918	1027629	2400
10	5814-	5564	4453	4718	853743	843349	2400
30	5294-	5031	4054	4266	700910	691852	1000
100	4657-	4446	3567	3724	532914	532456	1000
300	3988-	3746	3054	3149	385389	382553	1000
1000	3093-	2826	2369	2369	225978	220275	
3000	1946-	1637	1490	1490	84046	83887	
10000							
30000							
MAXIMUM DOSE 6160							
EFFECTIVE FALLOUT SHEAR 0.2 KNOTS/1000 FT. ALTITUDE							
1	2	3	4	5	6	7	8
DOSE (ROENTGENS)	MAXIMUM UPWIND POSITION	MAXIMUM DOWNWIND DISTANCE	CROSSWIND HALFWIDTH AT ORIGIN	MAXIMUM CROSSWIND HALFWIDTH	ACTUAL AREA	ESTIMATED AREA (ELLIPSE)	RANGE TO MAXIMUM WIDTH
1	6618-	6517	7598	7766	1605968	1602238	1000
3	6166-	6031	7079	7219	1401197	1383127	1000
10	5628-	5441	6462	6569	1160260	1142184	1000
30	5089-	4903	5842	5913	942944	928057	1000
100	4422-	4313	5078	5099	699748	699617	1000
300	3711-	3523	4261	4261	491611	484252	
1000	2727-	2585	3131	3131	259767	261296	
3000	1287-	1131	1477	1477	54203	56114	
10000							
30000							
MAXIMUM DOSE 4109							
EFFECTIVE FALLOUT SHEAR 0.4 KNOTS/1000 FT. ALTITUDE							
1	2	3	4	5	6	7	8
DOSE (ROENTGENS)	MAXIMUM UPWIND POSITION	MAXIMUM DOWNWIND DISTANCE	CROSSWIND HALFWIDTH AT ORIGIN	MAXIMUM CROSSWIND HALFWIDTH	ACTUAL AREA	ESTIMATED AREA (ELLIPSE)	RANGE TO MAXIMUM WIDTH
1	6381-	6344	13147	13147	2643179	2627853	
3	5911-	5801	12178	12178	2258384	2240311	
10	5348-	5206	11018	11018	1842400	1826606	
30	4777-	4663	9842	9842	1464403	1459335	
100	4060-	3989	8364	8364	1055227	1057489	
300	3271-	3121	6739	6739	678161	676541	
1000	2088-	1955	4302	4302	270075	273222	
3000							
10000							
30000							
MAXIMUM DOSE 2289							

Calculated Fallout Contours

("H+1" Dose Rate Contours)

3 YIELD (MEGATONS)
 20 WIND (KNOTS)

ALL DISTANCES AND AREAS ARE SHOWN IN STATUTE MILES TO 2 DECIMAL PLACES. DECIMAL (NOT SHOWN) SHOULD BE READ BEFORE LAST 2 DIGITS.

EFFECTIVE FALLOUT SHEAR 0.1 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	979-	72661	1210	6038	6555591	6984207	44200
3	898-	63941	1124	5028	4861580	5120636	38400
10	801-	54068	1022	3990	3299025	3438641	33000
30	704-	44800	918	3095	2136772	2211972	28000
100	582-	34296	790	2191	1190912	1200469	19200
300	450-	24446	650	1456	582354	569287	12000
1000	266-	13584	450	805	183443	175067	6400
3000	4-	4443	44	363	22373	25359	1000
10000							
30000							
MAXIMUM DOSE							
5041							
EFFECTIVE FALLOUT SHEAR 0.2 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	978-	67831	1226	9788	9511327	10579404	44200
3	897-	59057	1139	7941	6755735	7478680	38400
10	800-	49182	1035	6049	4343593	4749484	33000
30	702-	39932	930	4446	2644253	2837702	23400
100	580-	29598	799	2966	1329391	1405916	19200
300	448-	20168	657	1817	572399	588318	12000
1000	263-	10458	454	869	152193	146314	6400
3000	6	3319		363	18146	18945	1000
10000							
30000							
MAXIMUM DOSE							
4779							
EFFECTIVE FALLOUT SHEAR 0.4 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	975-	62526	1286	16618	14673234	16575897	44200
3	893-	53640	1194	13127	10012394	11244695	33000
10	796-	43675	1084	9703	6032717	6778161	28000
30	697-	34386	973	6838	3386061	3768568	23400
100	575-	24167	834	4199	1482991	1631773	15400
300	442-	15202	684	2316	534456	569010	9000
1000	254-	6918	466	969	108063	109134	4200
3000	153	1956		343	8914	11354	1000
10000							
30000							
MAXIMUM DOSE							
4033							

Calculated Fallout Contours

("H+1" Dose Rate Contours)

10 YIELD (MEGATONS)

0 WIND (KNOTS)

ALL DISTANCES AND AREAS ARE SHOWN IN STATUTE MILES TO 2 DECIMAL PLACES. DECIMAL (NOT SHOWN) SHOULD BE READ BEFORE LAST 2 DIGITS.

EFFECTIVE FALLOUT SHEAR 0.1 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	8548-	8272	7536	8436	2202849	2228855	2400
3	8033-	7727	7092	7872	1930318	1948705	2400
10	7427-	7130	6548	7203	1633777	1647033	2400
30	6828-	6586	6020	6532	1357567	1376435	2400
100	6105-	5811	5382	5708	1077645	1068413	2400
300	5360-	5030	4725	4949	818452	807751	1000
1000	4401-	4160	3880	4006	539541	538740	1000
3000	3290-	2942	2901	2901	291151	283966	
10000	1211-	928	1068	1068	33507	35894	
30000							
MAXIMUM DOSE							
12077							
EFFECTIVE FALLOUT SHEAR 0.2 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	8397-	8188	10275	10730	2831312	2795348	2400
3	7873-	7641	9632	9989	2475714	2434047	2400
10	7254-	7041	8875	9123	2087466	2048454	1000
30	6639-	6493	8123	8329	1719785	1718147	1000
100	5892-	5670	7209	7362	1357036	1336952	1000
300	5116-	4881	6260	6351	1013055	997368	1000
1000	4101-	3910	5018	5018	640769	631400	
3000	2877-	2664	3520	3520	306560	306416	
10000							
30000							
MAXIMUM DOSE							
8702							
EFFECTIVE FALLOUT SHEAR 0.4 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	8145-	7997	17040	17136	4403912	4345146	1000
3	7603-	7445	15905	15976	3826983	3776341	1000
10	6961-	6841	14561	14598	3192548	3164718	1000
30	6317-	6241	13215	13215	2630488	2606863	1000
100	5527-	5366	11562	11562	2000407	1978353	
300	4691-	4567	9814	9814	1431273	1427286	
1000	3557-	3390	7440	7440	814304	811809	
3000	2027-	1856	4241	4241	256011	258649	
10000							
30000							
MAXIMUM DOSE							
5089							

Calculated Fallout Contours

("H+1" Dose Rate Contours)

10

 YIELD (MEGATONS)

20

 WIND (KNOTS)

ALL DISTANCES AND AREAS ARE SHOWN IN STATUTE MILES TO 2 DECIMAL PLACES. DECIMAL (NOT SHOWN) SHOULD BE READ BEFORE LAST 2 DIGITS.

EFFECTIVE FALLOUT SHEAR 0.1 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	1563-	89662	1990	9100	12380973	13040563	57000
3	1445-	79705	1260	7732	9385994	9856043	50400
10	1304-	68494	1705	6286	6689232	6892139	44200
30	1164-	58005	1551	5056	4591718	4698733	33000
100	992-	46166	1363	3798	2797596	2813159	28000
300	811-	35060	1165	2743	1565298	1545447	19200
1000	570-	22623	898	1714	649126	624424	12000
3000	272-	11382	553	939	179661	171927	4200
10000							
30000							
MAXIMUM DOSE							
9901							
EFFECTIVE FALLOUT SHEAR 0.2 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	1561-	84389	2019	14403	17627684	19445294	57000
3	1443-	74409	1887	11937	12975752	14222935	50400
10	1303-	63235	1730	9387	8787273	9516451	38400
30	1162-	52796	1573	7286	5743928	6175557	33000
100	990-	41137	1382	5129	3241511	3394144	28000
300	808-	30376	1180	3478	1657131	1703476	19200
1000	566-	18740	908	1948	604100	590697	9000
3000	267-	8978	555	977	147055	141820	4200
10000							
30000							
MAXIMUM DOSE							
9505							
EFFECTIVE FALLOUT SHEAR 0.4 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	1555-	78433	2132	24625	27323715	30940441	50400
3	1435-	68362	1991	20007	19444547	21935403	44200
10	1295-	57115	1824	15291	12339011	14029820	38400
30	1154-	46547	1658	11296	7680006	8481588	28000
100	981-	35060	1453	7593	3926634	4298659	23400
300	798-	24586	1237	4738	1757978	1889025	15400
1000	553-	13870	946	2355	525807	533447	9000
3000	248-	5937	561	1035	102082	100531	2400
10000							
30000							
MAXIMUM DOSE							
8294							

Calculated Fallout Contours

("H+1" Dose Rate Contours)

100 YIELD (MEGATONS)

0 WIND (KNOTS)

ALL DISTANCES AND AREAS ARE SHOWN IN STATUTE MILES TO 2 DECIMAL PLACES. DECIMAL (NOT SHOWN) SHOULD BE READ BEFORE LAST 2 DIGITS.

EFFECTIVE FALLOUT SHEAR 0.1 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	12298-	11999	15804	18714	6864245	7142190	4200
3	11651-	11275	14973	17558	6110110	6325942	4200
10	10899-	10484	14006	16213	5294197	5445618	4200
30	10163-	9760	13061	14873	4853973	4654744	4200
100	9291-	8957	11940	13268	3762283	3802986	2400
300	8417-	7982	10816	11885	3043961	3061611	2400
1000	7340-	6914	9432	10157	2269032	2274138	2400
3000	6196-	5747	7962	8314	1581863	1559628	1000
10000	4628-	4230	5947	6075	831203	845206	1000
30000	2435-	1930	3130	3130	212285	214632	
MAXIMUM DOSE 45596							
EFFECTIVE FALLOUT SHEAR 0.2 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	12200-	11955	18570	20774	7764393	7882290	4200
3	11548-	11230	17577	19483	6909008	6971052	4200
10	10789-	10435	16421	17962	5982225	5988332	4200
30	10045-	9710	15290	16500	5139718	5120309	2400
100	9162-	8886	13945	14929	4239092	4232161	2400
300	8274-	7907	12593	13334	3417228	3388984	2400
1000	7175-	6833	10921	11332	2526982	2493518	2400
3000	6000-	5621	9133	9376	1737482	1711596	1000
10000	4362-	4029	6640	6663	889152	878359	1000
30000	1883-	1453	2866	2866	148176	150217	
MAXIMUM DOSE 38591							
EFFECTIVE FALLOUT SHEAR 0.4 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	11978-	11819	26722	27618	10478771	10323651	2400
3	11313-	11090	25239	26009	9307147	9152678	2400
10	10536-	10291	23506	24123	8034039	7891812	2400
30	9773-	9561	21805	22264	6870709	6761662	2400
100	8863-	8677	19774	20085	5630387	5533849	1000
300	7941-	7688	17718	17959	4487641	4408897	1000
1000	6789-	6604	15148	15292	3232870	3217090	1000
3000	5533-	5270	12344	12367	2133097	2098395	1000
10000	3693-	3427	8240	8240	926634	921616	
30000							
MAXIMUM DOSE 26321							

Calculated Fallout Contours

("H+1" Dose Rate Contours)

100 YIELD (MEGATONS)
 20 WIND (KNOTS)

ALL DISTANCES AND AREAS ARE SHOWN IN STATUTE MILES TO 2 DECIMAL PLACES. DECIMAL (NOT SHOWN) SHOULD BE READ BEFORE LAST 2 DIGITS.

EFFECTIVE FALLOUT SHEAR 0.1 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	3732-	127945	5220	19319	38933412	39928294	79200
3	3490-	115354	4923	16978	30979691	31694393	64000
10	3206-	101400	4577	14510	23504341	23841794	57000
30	2927-	88435	4236	12313	17475678	17671114	50400
100	2591-	73911	3827	9972	12009215	11982924	38400
300	2250-	60364	3412	7962	7919316	7830603	33000
1000	1820-	45180	2889	5857	4413677	4323969	23400
3000	1348-	31048	2311	4061	2148992	2066398	15400
10000	658-	15586	1431	2298	500716	586454	6400
30000	828	2982		496	19027	29693	2400
MAXIMUM DOSE 32262							
EFFECTIVE FALLOUT SHEAR 0.2 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	3728-	122252	5304	28114	51508908	55633969	79200
3	3486-	109828	5002	24166	40091364	43014596	71400
10	3202-	96019	4649	20015	29054964	31194352	57000
30	2922-	83195	4302	16523	21209756	22350755	50400
100	2586-	68929	3886	12869	13938410	14456404	44200
300	2244-	55718	3463	9854	8766001	8971657	33000
1000	1813-	41083	2930	6850	4613831	4615790	23400
3000	1339-	27738	2340	4468	2096995	2040906	15400
10000	646-	13647	1439	2362	554067	530243	4200
30000	887	2553		405	10873	21896	1000
MAXIMUM DOSE 31429							
EFFECTIVE FALLOUT SHEAR 0.4 KNOTS/1000 FT. ALTITUDE							
1 DOSE (ROENTGENS)	2 MAXIMUM UPWIND POSITION	3 MAXIMUM DOWNWIND DISTANCE	4 CROSSWIND HALFWIDTH AT ORIGIN	5 MAXIMUM CROSSWIND HALFWIDTH	6 ACTUAL AREA	7 ESTIMATED AREA (ELLIPSE)	8 RANGE TO MAXIMUM WIDTH
1	3715-	115219	5628	46853	77683999	87532368	79200
3	3472-	102776	5302	39566	59141542	66033303	64000
10	3187-	88959	4926	32127	41679937	46501429	57000
30	2906-	76181	4535	25699	29939906	31926095	50400
100	2568-	62025	4110	19253	17928296	19534226	38400
300	2224-	49028	3657	13927	10507322	11212049	33000
1000	1789-	34876	3086	8979	4980272	5171466	19200
3000	1309-	22413	2450	5386	1997653	2006853	12000
10000	602-	10198	1465	2542	441994	431309	4200
30000							
MAXIMUM DOSE 28643							

ACKNOWLEDGEMENT

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